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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/606,905 | 06/26/2003 | James E. Lindemuth | H1799-00187 | 5679 |

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EXAMINER

MCKINNON, TERRELL L

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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3743

DATE MAILED: 04/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/606,905

Applicant(s)

LINDEMUTH ET AL.

Examiner

Terrell L Mckinnon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13-16 is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 1.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3, 5, 6, 8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto et al. (U.S. 6,397,935) in view of Eastman (U.S. 4,274,479).

Yamamoto discloses a flat plate heat pipe comprising:

- a substantially L-shaped enclosure having an internal surface and a plurality of post (90) projecting from the internal surface (Figs. 4a, 5a and 13a);
- a working fluid disposed within the enclosure;
- a grooved wick disposed on at least a portion of the internal surface (51 and 46);
- the grooved wick including at least two lands that are in fluid communication with one another through a particle layer disposed between the at least two lands (Figs. 16a and 16b).

Yamamoto's invention fails to disclose a particle layer formed of substantially copper; and a method of making a heat pipe wick.

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3. However, Eastman teaches a method of making a sintered wick for heat pipes comprising a slurry particle layer (12) formed substantially of copper (column 4, line 19); the method of making a heat pipe wick on the inside surface of a heat pipe comprising all of the method steps (column 1, lines 18-20; column 2, lines 61-column 3, line 18; column 4, lines 1-24); and a working fluid inside the heat pipe.

Given the teachings of Eastman, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the heat pipes inner surface of Yamamoto with a particle layer formed of substantially copper; a method of making a heat pipe wick; and a working fluid inside the heat pipe.

Doing so would eliminate the high cost associated with making grooves in the inner surface of the heat pipes by using a reusable mandrel, as disclosed by Eastman column 3, lines 25-55).

4. Claims 2, 4, 7, 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto et al. (U.S. 6,397,935) in view of Eastman (U.S. 4,274,479) as applied to claims above, and further in view of Khrustalev et al. (U.S. 6,536,510).

Yamamoto's invention discloses all of the claimed limitations from above except for the particle layer comprises a thickness that is less than about three average particle diameters; and wherein six average particle diameters is within a range from about .005 millimeters to about .5 millimeters.

5. However, Khrustalev teaches a sintered grooved wick layer (64) wherein six average particle diameters is within a range from about .005 millimeters to about .5

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millimeters (column 6, lines 51-54).

Given the teachings of Khrustalev, it would have been obvious to one of ordinary skill in the art at the time of the invention to further modify the heat pipe of Yamamoto with a particle layer comprising a thickness that is less than about three average particle diameters; and wherein six average particle diameters is within a range from about .005 millimeters to about .5 millimeters.

Doing so would provide an efficient wick thickness for transferring heat in a heat pipe.

6. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamamoto et al. (U.S. 6,397,935) in view of Eastman (U.S. 4,274,479) as applied to claims above, and further in view of Tung et al. (U.S. 2003/0136550).

Yamamoto's invention discloses all of the claimed limitations from above except for the posts being coated with a sintered material.

7. However, Tung teaches post (27) being coated with a sintered wick layer (24).

Given the teachings of Khrustalev, it would have been obvious to one of ordinary skill in the art at the time of the invention to furthermore modify the heat pipe of Yamamoto with the posts being coated with a sintered material.

Doing so would provide increase and enhance the heat pipes heat transfer capabilities.

Allowable Subject Matter

8. Claims 13-16 are allowed.

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Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following references are cited for disclosing related limitations of the applicant's claimed and disclosed invention. Meyer, IV et al, Moore, Cho et al.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Terrell L Mckinnon whose telephone number is 703-305-0059. The examiner can normally be reached on Monday -Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Henry Bennett can be reached on 308-0101. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Terrell L Mckinnon
Primary Examiner
Art Unit 3743
April 5, 2004